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Endangered & Threatened **SPECIES** *of Pennsylvania*



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Wild Resource
Conservation Fund



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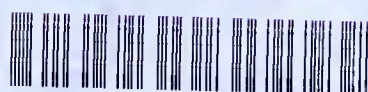
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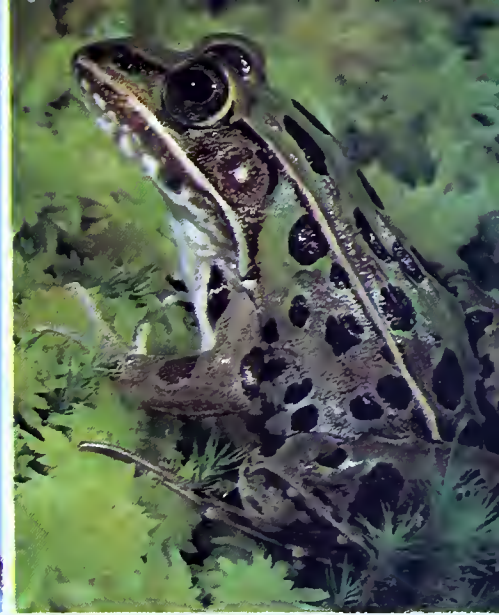
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Endangered & Threatened **SPECIES** of Pennsylvania

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Pennsylvania Fish
Commission.
Endangered & threatened
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Introduction

This booklet was produced by the Pennsylvania Fish and Game Commissions with monies derived from the Wild Resource Conservation Fund. It is designed to give the reader an overview of the general description of the animal, why it is either endangered or threatened and the management practices recommended to prevent its demise in the Commonwealth.

It is hoped that the reader will become aware of the delicate nature by which each species survives and develops an appreciation of the need to preserve and protect the environment in which each lives.

Endangered or Threatened?

The following criteria are used in determining whether a species is considered endangered or threatened.

ENDANGERED:

Species or subspecies in danger of extinction throughout all or a significant portion of its range.

THREATENED:

Species or subspecies which is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

compiled and written by
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and
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Narratives written by Bob Mitchell
— *Pennsylvania Game Commission*
Clark Shiffer - *Pennsylvania Fish Commission*

Illustrations and design by Ted Walke
— *Pennsylvania Fish Commission*

Edited and Compiled by Steve Ulsh
— *Pennsylvania Fish Commission*

Additional Information

A hard cover book, *Species of Special Concern*, is available for \$30.00 from the Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, PA 15213. It contains biological information on over two hundred plants and animals that are rare and endangered in Pennsylvania.

Front cover photo credits —

• National Wildlife Federation • Robert Zappalorti • Robert Zappalorti • Clark Shiffer • Wild Resource Conservation logo photo by S. Lipschutz VIREO

Bald Eagle

Haliaeetus leucocephalus

IDENTIFYING CHARACTERISTICS: Bald eagles are among the largest birds of prey. They may weigh up to 14 pounds and sport 7-foot wingspans. Bald eagles are most readily identified by their white heads and tails, however, they don't attain this characteristic plumage until they reach four or five years of age. Until that time they are essentially dark brown with varying amounts of white mottling.



M. P. Kahl, VIREO

BIOLOGY-NATURAL HISTORY: Bald eagles may be found throughout North America, most often around water where they scavenge on fish. Other carrion and live small animals are also among their prey items. Eagles don't reach adulthood and begin nesting until age four or five. They nest in large trees near water, and they normally produce one or two young per year. Adults will continue using and seasonally add to the same nest for years. After the breeding season eagles migrate south to areas where open water exists through the winter. Bald eagles nest in the northwest corner of the state, in the Pymatuning-Conneaut Marsh area; but nonbreeding adults and subadults may be found throughout the state at any time of the year.

PREFERRED HABITAT: Bald eagles thrive around bodies of water where adequate food exists and human disturbance is limited.

REASONS FOR BEING ENDANGERED: Water pollution made many areas of the state — and continent — unsuitable for eagles, and many former nesting sites have been lost to human development and encroachment. But the most devastating cause of the eagle's decline was the effect of the pesticide DDT and its derivatives on eagle reproduction. This pesticide was widely used in this country beginning in the 1940s. It was found, however, to be accumulating in eagles where it caused eggs to be produced which were too thin to withstand incubation. Although these pesticides did not directly kill adults, they did reduce the number of young eagles produced each year to the point where adults were dying at a rate faster than young were born. Therefore, the bald eagle population plummeted. In 1972, the use of this pesticide in the United States was outlawed, and this drastic decline halted.

MANAGEMENT PRACTICES: The future looks bright for bald eagles in the state. Our waterways are cleaner and pesticide use is now controlled. The Pennsylvania Game Commission monitors the nesting success of bald eagles in the Pymatuning area, where the number of young produced annually has risen dramatically over production in the 1960s and '70s. In addition, in 1983 the Game Commission launched a Bald Eagle Recovery Program through which young eagles are taken from the wild in Saskatchewan and raised in artificial nests on towers located along the Susquehanna and Delaware Rivers. It is hoped these eagles return to these watersheds and begin nesting after they become adults.



ENDANGERED

Osprey

Pandion haliaetus



IDENTIFYING CHARACTERISTICS: Ospreys are large, striking fish-eating birds of prey most often seen around water. They may exceed 24 inches in length and sport wingspans approaching 6 feet. Ospreys are dark brown above, bright white below with some brown streaking across the breast. Key identification characteristics are the prominent dark eye stripes, black patches at the crooks of bent wings, and wings arched above the bird in flight.

BIOLOGY-NATURAL HISTORY: The osprey is one of the world's most widely distributed birds. They are found along seacoasts and major waterways on every continent except Antarctica. They prey almost exclusively on fish. Ospreys nest in colonies or singly. Their stick nests are large and usually built near water. A breeding pair adds to the nest every year it's occupied. They usually nest in large trees, but they may be found nesting on channel markers, telephone poles, chimneys and man-made platforms built specifically for their use.

PREFERRED HABITAT: Ospreys may be found anywhere around open water containing adequate fishing opportunities.

REASONS FOR BEING ENDANGERED: Ospreys no longer nest in Pennsylvania. They are commonly seen migrating through the state, and occasional nonbreeding birds are found here in the summer. In the early 1900s ospreys nested along the state's rivers and streams, but habitat destruction and water pollution made these areas unsuitable and they stopped nesting here. Osprey populations were further decimated where they still existed through the effects of pesticides on their reproductive capabilities. Populations now appear to be rebounding from these effects, but no ospreys have yet started nesting in this state.

MANAGEMENT PROGRAMS: The osprey has been classified as endangered in Pennsylvania, despite the fact they apparently are not currently nesting here, to provide maximum protection to young ospreys being raised and released here as part of a reintroduction project designed to establish nesting ospreys in the state. Since 1980 young ospreys have been taken from their nests in the Chesapeake Bay area, and raised on artificial towers in eastern Pennsylvania in hopes they return here as breeding adults.

No ospreys are known to be nesting in Pennsylvania at this time.



Short-eared Owl

Asio flammeus

IDENTIFYING CHARACTERISTICS:

The short-eared owl received its name from its lack of "ear" tufts. It's about the size of a crow, 13 to 17 inches long, and has a 38- to 44-inch wingspread. Color is variable, from light to dark brown. The dark patches on undersides of wings, and large buff-color patches on upper-sides are most distinctive. There are also dark patches around the eyes.



O.S. Pettingill, Jr., VIREO

BIOLOGY/NATURAL HISTORY: Short-eared owls are birds of the open country. They may be found in Pennsylvania throughout the year. They nest on the ground, sometimes in colonial groups. The nest is a slight depression, sparsely lined with grass and feathers, often at the base of a clump of weeds or grasses. A normal clutch consists of 4 to 7 white eggs, but up to 14 have been reported. Young hatch about three weeks after egg laying, and are able to fly in about a month. Adults may perform a crippled-bird display to entice intruders away from nest and young. Unlike most other owls, the short-eared is active at dusk, dawn, and even, at times in mid-day. They, therefore, are seen often by man.

PREFERRED HABITAT: Short-eared owls have a wide distribution. In addition to North America, they are found in South America, Europe and Asia. These owls may be found nesting in the southeast corner of Pennsylvania, in the marshland and meadows around the Philadelphia International Airport. They used to nest along Lake Erie. Short-eared owls are more likely to be encountered here in the winter, when several may be seen together, hovering or flying low and in circles over agricultural fields in search of their main prey, meadow mice.

REASONS FOR BEING ENDANGERED: Suitable nesting habitat for the short-eared owl in Pennsylvania is extremely limited, and there are tremendous pressures to develop the remaining habitat that does exist.

MANAGEMENT PROGRAMS: Surveys should be conducted to determine more precisely where and how many short-eared owls nest in the state. Then, areas where they are nesting may be protected and, if feasible, managed to provide more nesting opportunities.



ENDANGERED

King Rail

Rallus elegans



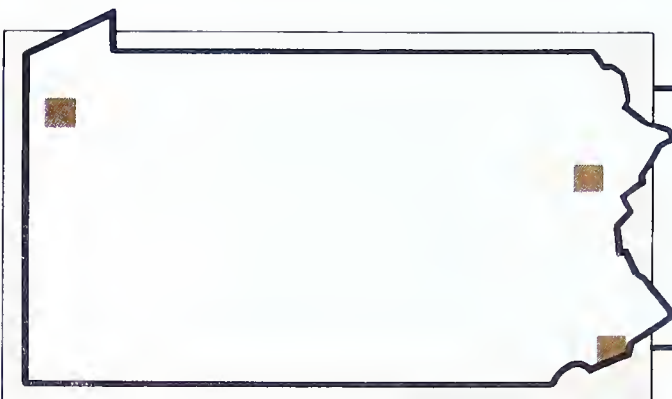
IDENTIFYING CHARACTERISTICS: The king rail is so named because of its large size and bright coloration. This plump chicken-size bird is a bright rusty color. It has a long bill and long legs. They range from 15 to 19 inches in height, and have 21 to 25-inch wingspans. Males are larger than females. King rails are brown with bright red-brown breasts. Bills are long, slightly decurved, and yellow with brown tips. These birds are extremely secretive and would rather run than fly to escape detection. They are seen rarely, therefore, and are most often located by their loud calls, a resonant grunting bup-bup, bup, bup, bup, more rapid at the end.

BIOLOGY-NATURAL HISTORY: King rail nests are platforms up to 14 inches in diameter, 6 to 8 inches above the water. They are built of grasses, sedges and cattails in shallow water marshes, roadside ditches and agricultural fields. From 6 to 15 pale, slightly spotted brown eggs are laid in a shallow depression of the nest. Overhead cover is often pulled over the nest to conceal it from above, and there may even be a ramp leading from the nest to the water. Young are able to fly about 63 days after hatching. King rails are migratory, but may be found year round in Pennsylvania if water in suitable habitat remains open. King rails feed on crustaceans, small fish, frogs and insects by wading in shallow water. In winter food items consist of grains — particularly rice — and berries.

PREFERRED HABITAT: This rail lives in freshwater and brackish marshes and roadside ditches in eastern North America, primarily along the Atlantic coast. In Pennsylvania, it is a very rare breeder in the southeastern and northwestern corners.

REASONS FOR BEING CLASSIFIED AS ENDANGERED: King rails were never common in Pennsylvania, but annual reports indicate the bird today is much less abundant than historically. This apparent decline is considered to be due primarily to losses of marshland habitat.

MANAGEMENT PROGRAMS: Efforts are being made to locate areas in the state where king rails exist, but the future of this bird remaining a breeding resident here hinges on the preservation and management of the marshland habitat it needs to thrive.



ENDANGERED

Indiana Bat

Myotis sodalis



Merlin D. Tuttle, Bat Conservation International, Milwaukee Public Museum

IDENTIFYING CHARACTERISTICS: The Indiana bat is difficult to distinguish from other species of bats, but there are three characteristics which permit accurate identification. Unlike the common little brown bat, which has black-brown lips, the Indiana bat has pink lips. This identification characteristic is useful when a cluster of hibernating bats is encountered. The Indiana bat has a smaller hind foot and a calcar (a spur extending from the foot) with a slight keel. The hair of the Indiana bat is black the first two-thirds of its length and then gradually fades to gray. The color of the tip varies from dark gray to black, or dark brown to brown. The hair of the little brown bat, however, distinctly changes from black to gray and then also is black to brown on the tip.

BIOLOGY-NATURAL HISTORY: The Indiana bat was the last Pennsylvania mammal to become known to science. It was not described as a species until 1928. The Indiana bat occurs in the eastern half of the United States, from northern Alabama up through New England. In Pennsylvania it was historically found hibernating in caves in the Appalachian Mountains in the central part of the state, with a possible preference for those that are wet or contain pools or streams. Little is known about the Indiana bat when it's not in hibernation. They apparently disperse widely over the countryside in the summer. A few females and young have been found during the summer, resting behind loose pieces of bark.

PREFERRED HABITAT: Indiana bats apparently require relatively specific climatic conditions for hibernation, namely, temperatures between 4° and 8° C, and a relative humidity from 66 to 95 percent.

REASONS FOR BEING ENDANGERED: The Indiana bat is listed as endangered on the federal endangered species list as this species has suffered drastic declines throughout its range. In the 1930s hibernating groups containing thousands of Indiana bats were found, but recent surveys of these same historical sites indicate a drastic decline in the species population. Man-caused changes to cave climates have caused 50 percent of the recent decline. Disturbance or vandalism during hibernation is another reason. These practices disrupt the bats, causing them to burn up fat reserves, leading to abortions of developing young and death to adults.

MANAGEMENT PRACTICES: Known hibernation sites in Pennsylvania have been barricaded to exclude human access. Surveys are conducted on a regular schedule to monitor changes in the number of Indiana bats hibernating here.



Eastern Mud Turtle

*Kinosternon
s. subrubrum*



Robert T. Zappalorti

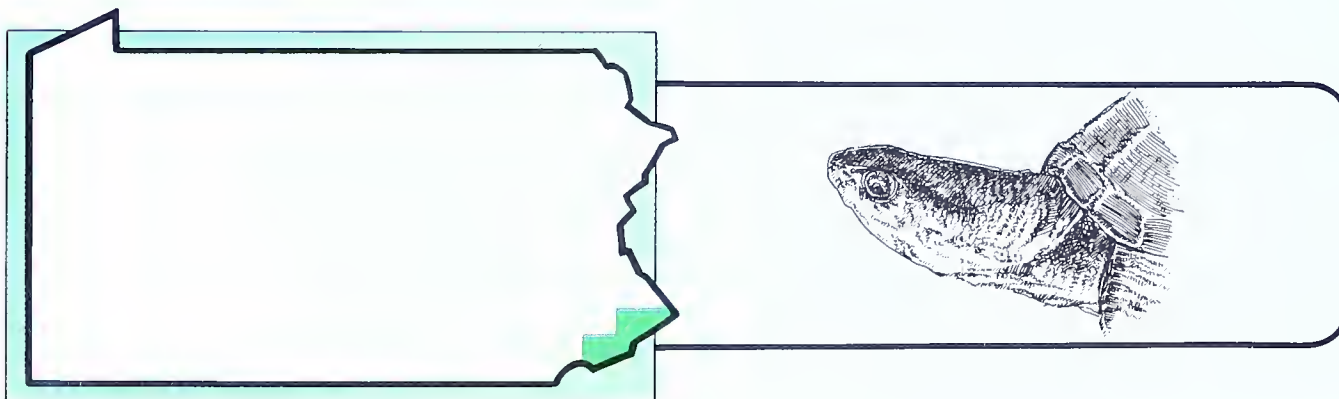
IDENTIFYING CHARACTERISTICS: This small (3"-4") semiaquatic turtle has a smooth upper shell ranging in color from olive to dark brown or black, and a large lower shell with two hinges and triangular pectoral scutes, ranging in color from yellowish brown to brown or black-mottled. A broad bridge connects the two shells. The head is irregularly spotted or streaked with yellow.

BIOLOGY-NATURAL HISTORY: The eastern mud turtle is active from March to late October; mating occurs in April and May. In June females dig a 3"-5" deep hole in open ground not far from water. They normally lay 2-5 eggs. Hatching usually takes place in late August or September, but the young may overwinter in the nest and emerge the following spring. Both young and adults feed on a variety of semi-aquatic animals and plants, alive or dead. They feed mostly at the bottom of shallow water areas, probing the mud and plant matter with the head, and are most active in the darker early morning and evening hours. If their shallow-water habitats dry, they burrow into the mud and remain dormant. Hibernation may occur in soft mud underwater, or in a burrow or under logs or vegetable debris on land.

PREFERRED HABITAT: Eastern mud turtles prefer soft-bottom, shallow bodies of slow-moving water with abundant aquatic vegetation. These habitats are mostly near the coast and may be either fresh or brackish water. It often lives in muskrat houses.

REASONS FOR BEING ENDANGERED: The limited coastal habitat in Pennsylvania is threatened with pollution, and filling or draining. Although mud turtles often wander about on land they require suitable bodies of water.

MANAGEMENT PRACTICES: Eastern mud turtle habitats are being monitored by various agencies, and the species is protected by regulation.



Red-Bellied Turtle

Chrysemys rubriventris



IDENTIFYING CHARACTERISTICS: Next to the snapping turtle, this is the largest of Pennsylvania turtles when full grown. Most individuals are 10" - 12½" in length (record length - 15¾") and resemble an overgrown painted turtle. Males especially may be almost entirely black, but there is usually a trace of reddish lines on the medially flattened upper shell and yellowish head stripes. The tip of the upper jaw is notched with toothed cusps on each side. The lower shell ranges in color from coral-pink to red, with darker markings in the young.

BIOLOGY-NATURAL HISTORY: Red-bellied turtles are active from May until October, spending much time sunning (basking) on logs or rocks. During June and July, females dig nests in cultivated open tracts, sometimes some distance from water. Usually 10-12 eggs are deposited 4" below the surface and the nest is then covered by the female. Some females may nest more than once a year. The time of hatching is believed to be in late summer, and young may overwinter in the nest. Young and adults feed on a variety of aquatic animals and plants, but fish are not normally a part of the diet.

PREFERRED HABITAT: Relatively large, deep creeks, rivers, ponds, lakes, and marshes with ample basking sites are preferred. The species tolerates brackish water conditions, but is usually a freshwater turtle, and found close to the coast from southern Massachusetts to northeastern North Carolina.

REASONS FOR BEING ENOANGERED: The limited habitat required by red-bellied turtles is under threat from industrial uses, the demand for property in a heavily urbanized area of the state, drainage or filling of wetlands, and pollution.

MANAGEMENT PRACTICES: Red-bellied turtle habitat is being monitored by various governmental agencies. A long-standing population of this species in Bucks County is studied each year by County park personnel under permit from the Fish Commission. The species is protected by regulation, as are all other state-listed endangered and threatened species.



ENDANGERED

Blanding's Turtle

Emydoidea blandingii



Robert T. Zappalorti

IDENTIFYING CHARACTERISTICS: At 5"-7½" in length, Blanding's turtle is of moderate size for Pennsylvania turtles, but no other is quite like it. The irregularly spotted or streaked upper shell is distinctive, as are the bright yellow chin and throat markings. The darkly marked lower shell is hinged like that of the common box turtle, but Blanding's turtles cannot completely enclose head and limbs within their shells like the box turtle. The upper jaw is notched at the tip.

BIOLOGY-NATURAL HISTORY: Blanding's turtles are generally timid turtles, but they can hiss loudly when captured while withdrawing head and limbs into their shells. They spend much time sunning on various objects above water, but quickly retreat to the water when disturbed. Although mating activity may occur anytime from March to November, the main period is from March to May. Nesting probably takes place mostly in June, when females dig a nest in sandy soil with the hind feet alone. Several clutches, containing 6-11 eggs each, may be laid each year. Hatching takes place in late August and September. Crayfishes and aquatic insects are important food items, but fishes and other vertebrates, snails, leeches, and plants are also eaten.

PREFERRED HABITAT: Shallow-water ponds, lakes, marshes, creeks and sloughs with soft bottoms and abundant aquatic vegetation are preferred by Blanding's turtles. In Pennsylvania, only habitat of this type found in the northwestern corner of the state is suitable, which indicates the probable importance of soil type, temperature, and other climatic factors. Although Blanding's turtles frequently wander about on land, they stay close to their aquatic habitat.

REASONS FOR BEING ENDANGERED: Blanding's turtles have historically occurred only in the state's northwestern corner, where their particular needs are being met. Drainage, filling, and pollution of their aquatic habitat has not been extensive, but the number of known colonies is small, and, therefore, quite vulnerable to such changes.

MANAGEMENT PRACTICES: Several sites for Blanding's turtles are under the jurisdiction of the Department of Environmental Resources and the Game Commission. Present habitat management is beneficial to this species. Additional sites probably exist on Game Commission property.



Bog Turtle

Clemmys muhlenbergii



Robert T. Zappalorti

IDENTIFYING CHARACTERISTICS: The bog turtle is among the smallest of North American turtles; adults are 4-4.5" long. The upper shell is dark brown with yellow to orange markings and covered with ridged plates that are eventually worn smooth; the lower shell is dark brown or black, sometimes with scattered light markings. A large red-orange or yellow blotch behind each eye is the most conspicuous color feature of an otherwise brown body lightly marked with orange or yellow.

BIOLOGY-NATURAL HISTORY: Mating takes place in May and early June. Each female then lays a clutch of 3-5 eggs during June or July in a nest she has dug. Eggs receive no parental care and hatchlings leave the nest several months later. Adults and young feed on a variety of plant and animal food, such as insects, berries, and even carrion. They do not wander far from hibernating sites in spring seepage, which they leave in April or May and return to in late summer. Summer hibernation (aestivation) may occur during July and August; individuals are otherwise encountered basking on sedge tussocks or moving slowly about in spring runs under concealing vegetation. When danger threatens, individuals burrow rapidly into the mucky bottom of spring runs.

PREFERRED HABITAT: Bog turtles live in relatively open portions of locally distributed sphagnum bogs, swamps or marshy meadows with slow-moving, spring-fed streams or spring runs with soft bottoms.

REASONS FOR BEING ENDANGERED: The primary reason for the bog turtle's status is the draining or other destruction of its preferred habitat. Since bog turtles have always been considered the rarest of North American turtles, they are valued at \$50 to \$75 per individual in this country, and possibly twice as much overseas, by turtle fanciers. Many have therefore been illegally removed from their habitat for commercial purposes. Since their habitats are widely separated, new turtles cannot move in to replace those removed, and destruction of these local habitats leaves the turtles with no suitable nearby habitat.

MANAGEMENT PRACTICES: Owners of private property where bog turtles live have been contacted and informal agreements made concerning the continued occurrence of the turtles there. Field surveys have been conducted to determine the status of historical and new sites, and to determine the nature of necessary changes in planned public use projects where bog turtle habitat is involved. Permit review and commentary concerning these projects is ongoing.



Midland Smooth Softshell

Trionyx m. muticus



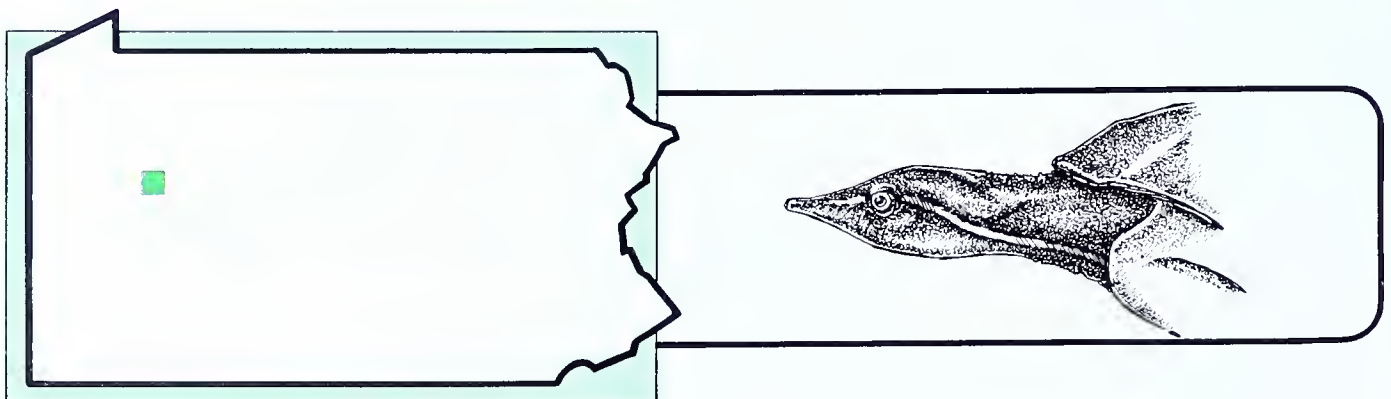
IDENTIFYING CHARACTERISTICS: The midland smooth softshell resembles the more common spiny softshell but differs as follows: (1) the smooth softshell lacks the spiny raised knobs on the upper shell, (2) its nostrils are round and lack ridges, (3) its limbs are not strongly marked with streaks or spots.

BIOLOGY-NATURAL HISTORY: The midland smooth softshell spends much of its time in the water, often with the body concealed beneath a covering of bottom sand or mud and the long neck and pointed snout extended to the water's surface. Occasionally, they bask on a sandy beach or mud flat close to the water, with outstretched neck lying on the substrate, and return quickly to the water when disturbed. Females are mature when 6-7 years old and males presumably earlier. Nests are dug in sand on sandbars, islands, or stream banks with the hind legs only, and 4-33 (usually 18-22) eggs are deposited 6"-9" deep. Females may nest as many as three times during the late May to July nesting season. Eggs hatch within 65-77 days. The young escape from the brittle egg shell by using their front limbs, rather than the "egg tooth" used by other turtle hatchlings. Food items are almost entirely various vertebrates and invertebrates, which are actively pursued or captured from ambush.

PREFERRED HABITAT: Large, sandy-bottomed rivers and streams with sparse aquatic plant growth and few rocks are preferred. The species has also been taken from impoundments or shallow bogs.

REASONS FOR BEING ENDANGERED: The midland smooth softshell is known in Pennsylvania from two sites only, both of which are large rivers that have been polluted, dredged, or impounded in various places. The occurrence records for this species date back to the beginning of this century. Pennsylvania populations have historically represented the northeastern-most segments of the range.

MANAGEMENT PRACTICES: The current status of the midland smooth softshell in Pennsylvania is not known, since no individuals of this species have been reported except the original captures at the turn of the century. A large river turtle survey may reveal additional occurrences of the species. Water quality at historical sites has improved, but impoundments and dredging are still present.



Threespine Stickleback

Gasterosteus aculeatus



National Fisheries Center, U.S. Fish & Wildlife Service

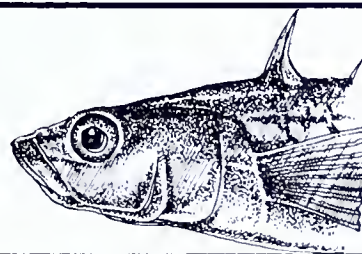
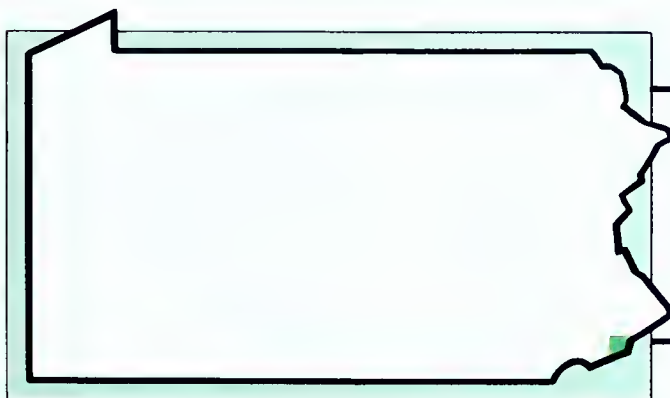
IDENTIFYING CHARACTERISTICS: The threespine stickleback averages 2" in length, but may be 4" long. The back is variably colored with silvery green, gray, olive, or brown or darkly mottled, and the sides and belly are paler and silvery. Three stout, (rarely 4) separated spines are found on the back and a series of bony plates partially cover the sides. During the breeding season, males become brilliant red on the sides and belly and the eye becomes bright blue. Females at this time are pinkish on throat and belly.

BIOLOGY-NATURAL HISTORY: Spawning of the threespine stickleback takes place in fresh water during June or July. Males build a cylindrical, hollow, open-ended nest on the bottom out of small twigs and plant material, which are fastened with a sticky secretion from the kidneys. Males court a number of females, each of which deposits her eggs within the hollow nest. When the nest is full of eggs the male loosens the top, fans a current of water over the eggs and guards them. Hatching may occur within a week; the young are herded and guarded by the male until able to fend for themselves. During their 3½ year life span threespine sticklebacks feed on a great variety of small animals, including the fry of their own kind.

PREFERRED HABITAT: Although primarily an inhabitant of salt water along both Atlantic and Pacific coasts, threespine sticklebacks spawn in freshwater coastal streams, and sometimes spend much of their lives in fresh water.

REASONS FOR BEING ENDANGERED: Pollution of many coastal streams, especially in southeastern Pennsylvania where the threespine stickleback occurs, has resulted in the reduction of certain fish populations.

MANAGEMENT PRACTICES: Fish Commission personnel interface with personnel of the Department of Environmental Resources and the Delaware River Basin Commission regarding water quality standards and practices where Delaware River Basin streams are concerned. Standards and practices are being upgraded as a result of new information about the current status of our aquatic resources.



Lake Sturgeon

Acipenser fulvescens



Ted Walke

IDENTIFYING CHARACTERISTICS: The lake sturgeon is the second largest of Pennsylvania sturgeons, reaching a length of 5'-7'! Adults are olive-brown to gray on the back and sides and white below, with dark brown to gray fins. The rows of bony scales on the top and sides are of the same color as the body.

BIOLOGY-NATURAL HISTORY: Lake sturgeon begin to spawn for the first time when they approach 15-20 years of age. Spawning occurs in the swifter portions of streams from early May to late June, or over rocky shoreline areas of lakes. The black eggs stick to rocks and logs and hatch within ten days. The tiny young are nourished by a yolk sac for another 10-20 days, when they then feed on small bottom dwelling animals like the adults. Males spawn at 2-3 year intervals and females at 4-6 year intervals, and may live for 55-80 years.

PREFERRED HABITAT: Lake sturgeon live in larger rivers and lakes. They are presently known to occur in Pennsylvania only in Lake Erie.

REASONS FOR BEING ENDANGERED: The pollution of large western Pennsylvania rivers, and the building of locks and dams which prevented upstream movement and spawning, eliminated lake sturgeon from these waters. Over fishing seriously reduced the Lake Erie populations. Slow to mature and reproduce themselves, lake sturgeon are very vulnerable to environmental changes.

MANAGEMENT PRACTICES: Legal harvesting of lake sturgeon is prohibited. Pollution abatement is proceeding in portions of Lake Erie and in the large rivers, but dams still block upstream movement of lake sturgeon.



Shortnose Sturgeon

Acipenser brevirostris



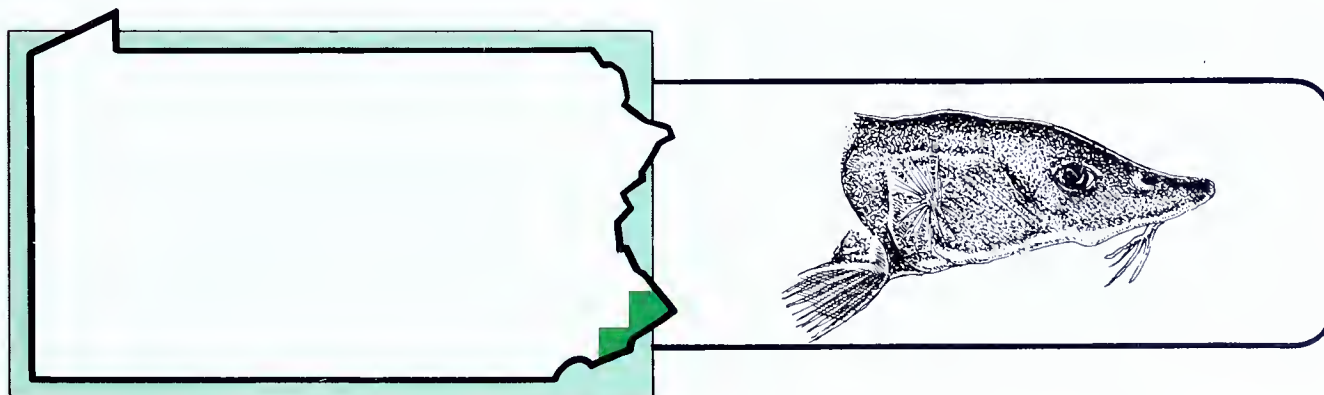
Tom Duran

IDENTIFYING CHARACTERISTICS: The Shortnose Sturgeon is the smallest of the 3 sturgeons still found in Pennsylvania, seldom exceeding 3' in length. The body color is dark brown to black on top and lighter brown to yellowish below. The large scales along each side are much lighter than the body color and the paired fins are outlined in white.

BIOLOGY-NATURAL HISTORY: Male shortnose sturgeon are mature after 4 years at a size of 20", and females are mature after 5 years at a size of 24". Spawning takes place in large tidal rivers from April to early June; the eggs are small, dark brown, and less numerous per pound of fish than other sturgeons. The early life history is unknown and young are rarely seen. Adults live in salt or brackish Atlantic coastal waters during most of the year, feeding on bottom-dwelling invertebrates and plant matter intermingled with bottom mud.

REASONS FOR BEING ENDANGERED: Pollution of tidal streams and estuaries, used by spawning adults and as nursery areas for young, is believed primarily responsible for a great decline in shortnose sturgeon numbers, along with over exploitation by fishermen.

MANAGEMENT PRACTICES: The National Marine Fisheries Service has produced various management strategies as part of a Shortnose Sturgeon Recovery Plan. These strategies include inventory and monitoring of natural populations, enforcement of existing environmental regulations concerning pollution and creation of new regulations, and studies of shortnose sturgeon environmental needs and limiting factors.



Massasauga

Sistrurus catenatus



IDENTIFYING CHARACTERISTICS: The massasauga is the smallest of Pennsylvania's three venomous snakes. Most individuals are 20"-30" in length (record: 39½"). Unlike the larger, black-tailed timber rattlesnake, the massasauga has a tail ringed with dark brown or black and the top of the head is covered with 9 large scales (plates) like our nonvenomous snakes. The belly is black, irregularly marked with pale yellow or white. The tail is tipped with yellow in the young and bears a small, but well-developed rattle.

BIOLOGY-NATURAL HISTORY: Massasaugas hibernate in water-saturated sites, 6"-24" beneath the surface of the ground, and remain active through the winter, raising their heads above the water in which they may lie. Crayfish burrows may be used to gain access to these winter quarters, from which they emerge in mid-April. After feeding on frogs and crayfish and sunning in the vicinity of these sites for about a month, they move to higher, drier old fields or meadows nearby to feed on various rodents and insects. Females with developing young may bask together in drier areas until birth of their young in August or early September. Females reach breeding age at two years and give birth to an average of 6-7 live young only every other year. Hibernation begins in mid-October and the young may enter hibernation later than the adults.

PREFERRED HABITAT: Massasaugas require relatively open old field and wet meadow habitat with lower-lying areas of saturated soil and higher, drier ground nearby. This combination of wet and dry habitat is only suitable for the massasauga in relict prairie terrain of certain far-western Pennsylvania counties.

REASONS FOR BEING ENDANGERED: Never common in Pennsylvania, massasaugas now may be found in half of their historic sites, due to dam building, highway construction, urbanization, forest succession, surface mining, and agricultural activity.

MANAGEMENT PRACTICES: Fish Commission personnel interface with other governmental and nongovernmental organizations during permit review of projects potentially damaging to massasauga habitat. On-site consultation with mining company personnel has resulted in mutually-acceptable modifications to proposed plans, thus taking the massasauga's continued existence into account. Since massasaugas are uncommon, they are valued by collectors, but are fully protected by regulations.



New Jersey Chorus Frog

Pseudacris triseriata kalmi



IDENTIFYING CHARACTERISTICS: This subspecies of the western chorus frog is similar in size (3/4"-1 1/2" long), but is somewhat more robust. The outermost pair of the three dark stripes on the back start at the snout and continue backward through the eye and down each side. These may be variously broken. A prominent light line is present beneath each eye along the upper lip.

BIOLOGY-NATURAL HISTORY: New Jersey chorus frogs move to small, sometimes temporary, bodies of water to breed, anytime from February to June. Males may arrive at the ponds before females and call loudly from sedgy or grassy clumps in the open. The eggs are deposited irregularly in loose gelatinous masses on the stems of matted vegetation not far below the surface of the water. The 1"-1 1/2" tadpoles are blackish to olive above with a bronzy belly, and transform to the adult stage within two months. Adults leave the breeding pools following mating and egg laying, and are only occasionally encountered in wooded areas during the remainder of the year.

PREFERRED HABITAT: In Pennsylvania the New Jersey chorus frog breeds in small, relatively open bodies of water with a mixture of shrubby and herbaceous aquatic vegetation, or sometimes in the shallow backwater areas of larger bodies of water with similar vegetation.

REASONS FOR BEING ENDANGERED: The populations of the New Jersey chorus frog in Pennsylvania are small and threatened with elimination as a result of industrial use of the areas they inhabit. The small breeding ponds and forested areas they require have been partially filled in or cleared.

MANAGEMENT PRACTICES: Pennsylvania Fish Commission personnel interface with Department of Environmental Resources and U.S. Fish and Wildlife Service personnel where possible threats to the habitat of this small frog is concerned. The status of the populations is monitored each spring.



Coastal Plain Leopard Frog

Rana utricularia



Robert T. Zappalorli

IDENTIFYING CHARACTERISTICS: This 2"-3½" frog is similar to the relatively more common northern leopard frog but differs as follows: (1) often a light spot in center of eardrum (2) longer, more pointed snout, (3) fewer spots on sides, (4) spots on back more elongate and not rimmed with lighter color, (5) vocal sacs of male are visible externally, (6) the top of the snout lacks a dark spot.

BIOLOGY-NATURAL HISTORY: Breeding activity in Pennsylvania takes place in early spring, when males may be heard calling during the period between mid-night and daylight. The call is a short, guttural trill (pulse rate 13/sec. or less vs. 20/sec. for the northern leopard frog) followed by 2-3 "clucking" sounds. Eggs are laid by the female in masses of vegetation, attached to submerged plant stems or sticks in shallow water, and are flattened clusters. Eggs hatch within several weeks, and the tadpoles are ready to transform to the adult stage at less than 1" about 3 months later. As transformation approaches the tadpoles' tails become conspicuously blotched with black. Adults may wander from the breeding sites during the summer.

REASONS FOR BEING ENDANGERED: The Coastal Plain leopard frog is endangered in Pennsylvania as a result of the loss of its breeding sites to industrial activity.

MANAGEMENT PRACTICES: Comments in the accounts of the New Jersey Chorus Frog apply here as well. The Coastal Plain habitats required by this species in the north are found only in a limited portion of the state, and potential threats to this habitat are being monitored.



Eastern Tiger Salamander

Ambystoma tigrinum



Robert T. Zappalorti

IDENTIFYING CHARACTERISTICS: Tiger salamanders are among our largest salamanders, averaging 7" - 9" in length. The olive-brown or yellow-brown body is irregularly marked with darker brown or black, but never spotted like its more common relative, the spotted salamander, *Ambystoma maculatum*.

BIOLOGY-NATURAL HISTORY: Tiger salamanders belong to a group of salamanders called "mole salamanders," because they burrow underground for most of the year. Anytime from December to March, adults emerge from underground retreats to gather at various moderately-deep ponds that persist into the summer months. Males court females and deposit sperm packets on the pond bottom, which females pick up and enclose within their vents. Clusters of 20-100 fertilized eggs are then attached to grasses and sticks near the bottom. After several days of this activity, adults leave the breeding ponds and return to a subterranean life. About 3-4 weeks later 3/4" gilled larvae hatch and grow rapidly, feeding like the adults on whatever animal life they can catch. After 3-4 months of growth the young leave the ponds and assume full adult coloration. They burrow like their parents and are ready to breed the following spring.

PREFERRED HABITAT: Tiger salamanders in Pennsylvania burrow in wooded to partially open terrain only in the eastern part of the state. Suitable, moderately-deep and persistent breeding ponds must be available during the breeding season. These ponds may be in forested areas, or may be small farm or gravel pit ponds in the open.

REASONS FOR BEING ENDANGERED: Land-use changes which eliminate the breeding ponds for tiger salamanders are probably the most critical factor threatening the continued existence of this species. The secretive nature and late winter breeding season render detection of this salamander difficult. In some instances land-use decisions which could have deleteriously affected the species have been modified because of this species's presence.

MANAGEMENT PRACTICES: Field surveys to locate breeding adults and their habitat will be conducted in eastern Pennsylvania. The location of colony sites will enable planning agencies and private landowners to make land-use decisions beneficial to the continued occurrence of tiger salamanders in Pennsylvania.



Eastern Mud Salamander

Pseudotriton m. montanus



Ted Walke

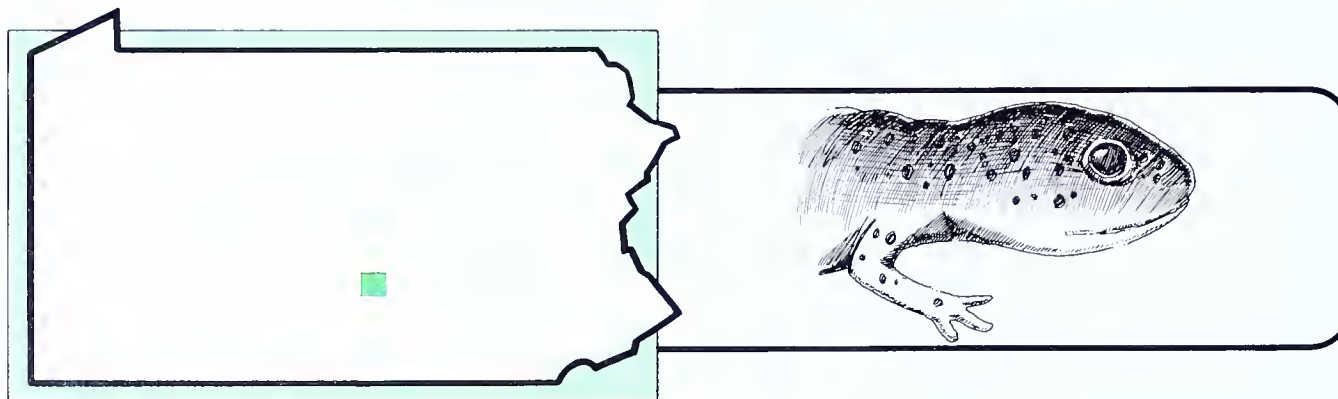
IDENTIFYING CHARACTERISTICS: The eastern mud salamander ranges in size from 3.5" - 6". It most closely resembles the northern red salamander, but its eye color is brown, not yellow, and the dark spots are fewer in number and more circular. The back color is of a darker red-brown that does not blend into the lighter red of the sides and belly.

BIOLOGY-NATURAL HISTORY: Nothing has been recorded concerning the biology of this species in Pennsylvania. In Virginia and the Carolinas, eastern mud salamanders engage in courtship in the fall and breed in early winter. Females deposit up to 200 eggs every other year. Transformation from larva to adult takes place in 17 months for most larvae, but some may require an additional year. Males mature in three years, and females in four years.

PREFERRED HABITAT: Eastern mud salamanders may be found in the fine, black muck under stones and logs, or burrowing in the muck of spring seepages, spring-fed brooks or swamps, along the coastal plain or piedmont regions from southern New Jersey south into Georgia.

REASONS FOR BEING ENDANGERED: The first specimen of the eastern mud salamander to be described was taken from South Mountain near Carlisle, Cumberland County. Additional specimens from this locality have not been found despite repeated searches. Reports of the occurrence of this salamander from that region of the state have not been confirmed. Although occurring at higher elevations at the southern edge of its range, its occurrence in mountainous country in the north is unusual.

MANAGEMENT PRACTICES: Additional searches should be made for this species in Pennsylvania.



Green Salamander

Aneides aeneus



Clark N. Shiffer

IDENTIFYING CHARACTERISTICS: Green salamanders are of average size (3¼" - 5") but no other Pennsylvania salamander has green lichen-like markings on a dark brown to blackish body color. The toes are somewhat expanded and square-tipped; the body is flattened and the jaw muscles (of males particularly) are large and strong.

BIOLOGY-NATURAL HISTORY: Courtship and breeding may be conducted anytime from May to September. Males use the strong jaws and projecting upper jaw teeth to bite and shove one another during territorial struggles. Following mating, females deposit an average of 17 eggs on the upper surface of sandstone rock crevices, and then remain with the eggs to defend them against would-be intruders. The young (less than 1") hatch 84-91 days later and soon seek mossy crevices. Both young and adults feed on various invertebrates inhabiting the rock crevices. Winter is spent deep within cracks and crevices below the frost line where a number of individuals may hibernate together. Females mating in late summer carry fertilized eggs through the winter and deposit them the following spring.

PREFERRED HABITAT: Green salamanders have been found in Pennsylvania only in certain crevices in sandstone rock cliffs or outcroppings of the Pottsville formation. These rocks are located on moist hardwood forest slopes or ravines, often near streams.

REASONS FOR BEING THREATENED: Green salamanders have historically been known to occur at one site in southern Fayette County, the northernmost known locality in their limited southern Appalachian range. Sand mining at this site may prove a threat to this species. Additional sites are likely to be found upon further search.

MANAGEMENT PRACTICES: As new sites are discovered for green salamanders, the monitoring of land-use becomes important. Removal of the forest cover at these sites eliminates the humidity levels these salamanders require, and is a greater threat to the colonies than the destruction or deterioration of rock outcroppings. Rock climbing activity at colony sites may prove detrimental if it is intensive.



Eastern Sand Darter

Ammocrypta pellucida



Ted Walke

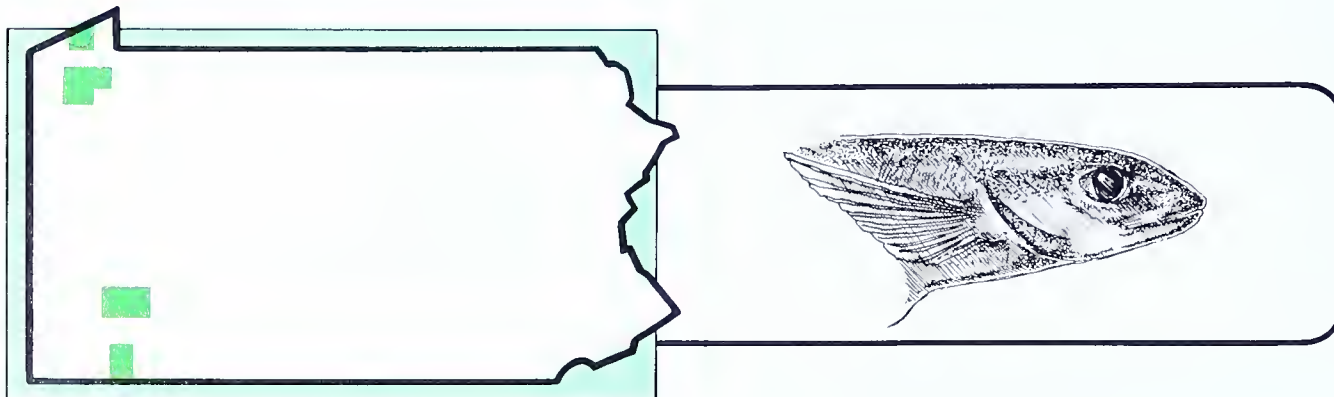
IDENTIFYING CHARACTERISTICS: The sand darter is a small member of the Perch Family, averaging 2.5" in total length. Adults are very pale yellowish above and silvery below, with a row of green spots along the top and sides. The flesh has a somewhat transparent quality.

BIOLOGY-NATURAL HISTORY: Sand darters spawn from early June until late July in the Ohio River basin and somewhat later in the Great Lakes. The young are white or silvery in color, and, like the adults, feed primarily on small insect larvae or other invertebrates. Sand darters conceal themselves in sand with only the eyes and snout protruding and dart out to capture prey.

PREFERRED HABITAT: Sand darters are found in streams ranging in size from small creeks to large rivers, with a bottom of sand, silt, mud, or gravel, and the wave-protected sandy beaches of Lake Erie. Sandy raceways of large rivers are especially preferred.

REASONS FOR BEING THREATENED: Agricultural and industrial pollution, especially siltation, have rendered many sand darter habitats unsuitable for this species. Dam construction and dredging have also created an adverse habitat for sand darters.

MANAGEMENT PRACTICES: As a threatened species sand darters are protected by regulation against taking, selling, importation or exportation. One of the streams in which it is found is designated as an exceptional quality water by the Department of Environmental Resources.



American Bittern

Botaurus lentiginosus



D. Roby. VIREO

IDENTIFYING CHARACTERISTICS: This large, cryptically-colored heron is most often seen when flushed from marshes. It's most easily identified by its large size — up to 34 inches in length, and with a 50-inch wingspan — and its streaked brown plumage. At rest, its black moustache-like cheek markings are diagnostic. In flight, conspicuous black outer wings are characteristic. The secretive American bittern may best be known for its habit of standing in tall reeds and grass with its bill pointing upward when it feels threatened. At times it even sways from side to side, moving like the reeds surrounding it. In this pose the bird blends in with its surroundings and often goes unnoticed.

BIOLOGY-NATURAL HISTORY: American bitterns nest in marshes across the northern United States and southern Canada. They spend the winters across the southern United States and down through Mexico and Central America. They nest singly, not in colonies like other herons. This species can be found year round in Pennsylvania. They are most often seen in this state during spring and fall migrations. A few nest in our southeast corner, often in the Tinicum Marsh near Philadelphia. American bitterns build platform nests of reeds and grasses near the water, and normally lay a clutch of 3 to 7 buff- or olive-brown eggs. Young hatch in 14 days and leave the nest after another two weeks. They are often seen stalking along shorelines and marshes where they prey on frogs, fish, snakes, crayfish, insects and other aquatic organisms.

PREFERRED HABITAT: American bitterns require wetland habitats. Marshes and borders along lakes and ponds, rivers and streams are where they are most likely found.

REASONS FOR BEING THREATENED: The American bittern is considered threatened because of the continuing disappearance of the wetland habitats it needs to thrive.

MANAGEMENT PROGRAMS: Areas in Pennsylvania where American bitterns regularly nest need to be identified and, where possible, protected from development.



Least Bittern

Ixobrychus exilis



IDENTIFYING CHARACTERISTICS: The least bittern is the smallest member of the Heron Family. This bird is from 11 to 14 inches in length and has a 16- to 18-inch wingspan. This primarily black and tan bird has a blackish-green cap and back, brown neck and underparts, and a white throat. The least bittern is most readily identified in flight by conspicuous, light, chestnut-color wing patches. A rare darker phase also exists. When disturbed, the least bittern is more likely to run for cover than fly, and like its relative, the American bittern, it also has the habit of freezing with its bill pointed straight up when alarmed.

BIOLOGY-NATURAL HISTORY: The least bittern nests in wetland areas throughout the eastern United States and along the Pacific Coast. It spends the winter from our southern states south to Columbia, South America. This species is a regular migrant through the state, but it nests here only in our northwest and southeast corners, and possibly in a few other locations, but not regularly or in significant numbers. The least bittern arrives in Pennsylvania in April, and builds its platform nest of reeds and grasses near open water. Four or 5 pale blue or green eggs are laid in the 6-inch nest in mid or late May. The young hatch in slightly over two weeks.

PREFERRED HABITAT: Least bitterns thrive in dense marshland environments, containing cattails and reeds along the coast and inland, where they feed primarily on small fish, amphibians, insects and small mammals.

REASONS FOR BEING THREATENED: The opportunities this species finds for nesting in Pennsylvania are limited and decreasing as the wetland habitat it needs for its survival is subject to heavy development pressures.

MANAGEMENT PROGRAMS: Areas where this species is known to nest should be protected. Surveys are being conducted to determine where it does actually nest, and marshland habitats can be created to provide additional nesting habitat.



Upland Sandpiper

Bartramia longicauda



O.S. Pettingill, Jr., VIREO

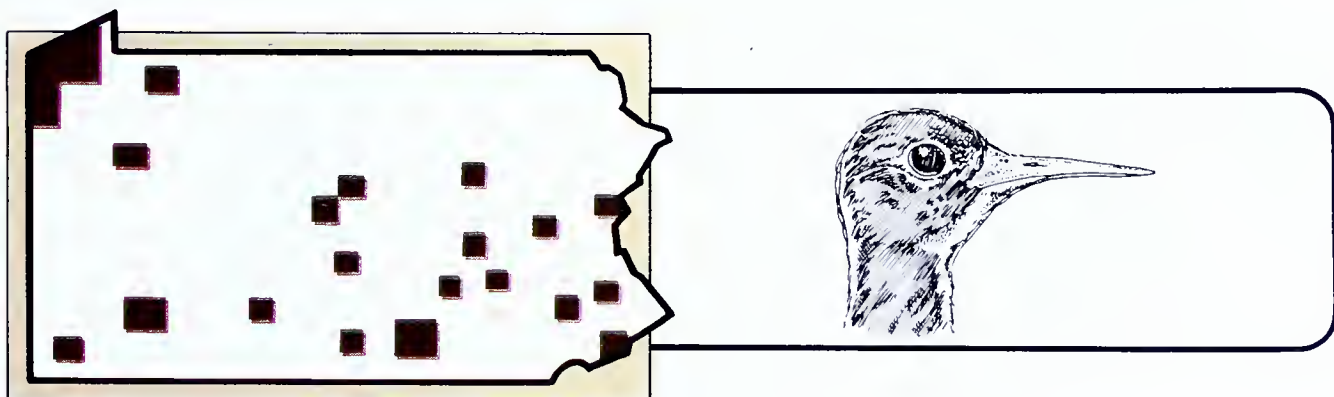
IDENTIFYING CHARACTERISTICS: The upland sandpiper, formerly called the upland plover, is a large light brown shorebird that comes inland during the nesting season. This bird is about 12 inches tall and has a 20-inch wingspan. The upland sandpiper can be identified by its long neck, a disproportionately small head, and long tail. Its back and wings are dark brown, its breast is streaked. The upland sandpiper is perhaps most readily identified by its preference for perching on wires and fenceposts, and its habit of holding its wings high above its back for a few moments after alighting.

BIOLOGY-NATURAL HISTORY: Upland sandpipers nest across North America; they spend the winters in South America. These birds arrive in Pennsylvania in March and April, and then leave in August after nesting. They are almost exclusively insectivorous, feeding primarily on grasshoppers, crickets, and weevils. Waste grain and weed seeds are also eaten. This out-of-place shorebird typically nests on the ground in grassy fields. The normal clutch consists of four eggs. Youth hatch in about three weeks, and the precocial young leave the nest as soon as the last one hatches. They can fly at about 18 days of age.

PREFERRED HABITAT: Upland sandpipers are birds of the open country. They may be found in fallow fields, pastures and grassy areas.

REASONS FOR BEING THREATENED: Upland sandpipers used to be much more common than they are today. Around the turn of the century they attracted the attention of market hunters looking for a bird to fill the void created by the decline, and ultimately extinction, of the passenger pigeon. Changing agricultural practices and extensive pesticide use which eliminates most insect life are thought to be keeping its numbers low now.

MANAGEMENT PROGRAMS: Before any management programs can be initiated, surveys need to be conducted to determine where and how many upland sandpipers are currently breeding in Pennsylvania.



Black Tern

Chidonias niger



Betty Darling, Cornell University Laboratory of Ornithology

IDENTIFYING CHARACTERISTICS: Terns are slender graceful fliers with long pointed wings. They are normally associated with coastal environments, but the black tern is found inland. During the breeding season this small bird is relatively easy to identify as it is the only tern with an all black body; in the fall juveniles and molting adults have black and white mottled plumages. Flashing light underwing linings make the black tern especially conspicuous in flight.

BIOLOGY/NATURAL HISTORY: Black terns nest across the northern United States and southern Canada; they spend the winters in South America. They are regularly seen migrating through Pennsylvania, appearing in April and May, and then again in August. Nonbreeding adults can be found here in the summers, but our northwest corner is the only place in the state where they nest. This area represents the southeast extreme in the species' breeding range. They build fragile cup-shape nests in reeds or on floating masses of dead plants, just above the water. A typical clutch consists of three olive or buff-brown marked eggs. Young hatch in three weeks, and first fly at three to four weeks of age. Black terns are primarily insectivorous, snatching up insects in flight. They also eat small fish and crustaceans which they pluck from the water surface.

PREFERRED HABITAT: Black terns leave coastal areas behind and come inland to nest in prairies and marshes. Winter finds them back along the coast, often in the company of other terns.

REASONS FOR BEING THREATENED: As black terns nest in Pennsylvania only in Crawford County, they are extremely susceptible to both man-caused and natural disasters. In addition, local authorities indicate the number of black terns nesting in this area has been declining over recent years.

MANAGEMENT PROGRAMS: The status of black terns in Pennsylvania needs to be more accurately determined through annual surveys. After it's learned where and how many black terns are nesting here, measures may be taken to protect and expand their natural habitat. But, as Pennsylvania lies on the margin of this species' breeding range, they may not ever be able to thrive here in significant numbers.



Sedge Wren

Cistothorus platensis



Betty Darling Cottrille, Laboratory of Ornithology, Cornell University

IDENTIFYING CHARACTERISTICS: The sedge wren, formerly known as the short-billed marsh wren, can best be distinguished from other wrens by its relatively small size. It's only 4½ inches high and has a 6-inch wingspan; streaked crown and back; faint buffy eye stripes; and a short tail which is often held upright.

BIOLOGY/NATURAL HISTORY: In summer sedge wrens are found from southern Saskatchewan and Minnesota across the Great Lake States to the east. They spend the winters along the Atlantic and Gulf Coasts, down into Mexico. Sedge wrens arrive in Pennsylvania in April and May, and then migrate south to brackish coastal marshes from August to October. These wrens are one of the last birds to nest in the state as they may be found nesting here as late as August. They nest in wetland areas where a typical clutch of 6 or 7 white eggs are laid in a globular nest built up to two feet off the ground. Young hatch in 12 to 14 days, and leave the nest at 2 weeks of age. Two broods can be produced each year.

PREFERRED HABITAT: For nesting, this bird requires damp meadows and marshes where sedges and grasses interspersed with small shrubs grow. They apparently don't do well in cattail marshes.

REASONS FOR BEING THREATENED: Sedge wrens are rare throughout their range in North America. They used to be found nesting at scattered locations across Pennsylvania. Over the past several decades, however, they have disappeared from many former haunts, and numbers have dropped significantly in others. The loss of habitat and changing agricultural practices are thought to be responsible for this decline.

MANAGEMENT PROGRAMS: The specific locations where sedge wrens currently nest in the state need to be determined and then, where feasible, protected.



Bewick's Wren

Thryomanes bewickii



Ted Walke

IDENTIFYING CHARACTERISTICS: The Bewick's wren is a relatively large wren. It has an unstreaked gray-brown back and white underparts. They are best identified by the conspicuous white stripes above their eyes, and long rounded tails with diagnostic white tips which flash conspicuously in flight.

BIOLOGY-NATURAL HISTORY: The Bewick's wren is found across the southern half of the United States. The southwestern corner of Pennsylvania represents a northeastern extreme for this species' breeding range. It winters across the southern United States and down into Mexico. They nest in cavities, anything from hollow fence posts and natural cavities, to tin cans and building crevices. The typical clutch contains 5 to 7 white eggs with brown spots. Young hatch around two weeks after egg laying, and after two more weeks, the young are ready to leave the nests.

PREFERRED HABITAT: The Bewick's wren lives in open or brushy areas, in thickets, orchards and along fencerows. They are found in brushy woodland areas, often along streams, and are also often found nesting around rural buildings.

REASONS FOR BEING THREATENED: This wren used to be found in significant numbers in Greene County, but in recent years the population there has declined. None were found during searches conducted in 1979 and 1980. Reasons for this decline are not known. Competition with the much more common house wren is suspected as these two closely related wrens don't exist in the same areas.

MANAGEMENT PROGRAMS: Before any research or management efforts can be made to determine and correct the reasons for this species' decline, thorough searches for nesting Bewick's wrens should be conducted in Greene and surrounding counties in southwestern Pennsylvania, in habitats where this wren may live. It should be remembered, though, that as Pennsylvania represents the northeast extreme of the species' range, it may never occur in an abundance comparable to that of southern and western states.



Henslow's Sparrow

Ammodramus henslowii



Betty Darling Cottrille, Laboratory of Ornithology, Cornell University

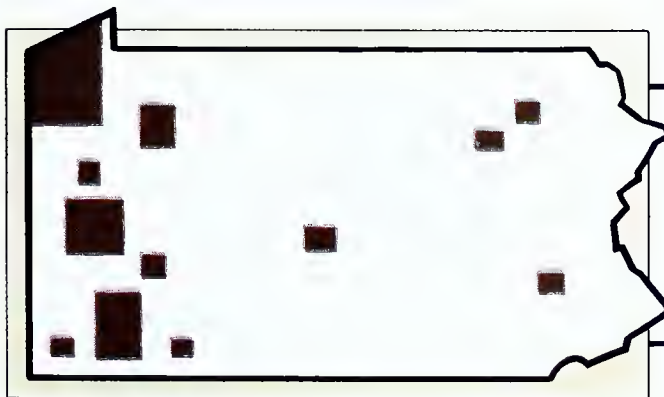
IDENTIFYING CHARACTERISTICS: The Henslow's sparrow is a small secretive bird of weedy fields. It can be distinguished from other sparrows by its reddish wings, streaked breast, and black stripes on an olive-green head. The head of this species is flatter in shape than those of other sparrows.

BIOLOGY/NATURAL HISTORY: Henslow's sparrows nest across the northeast United States, from South Dakota to southern New Hampshire. They spend the winters along the Atlantic and Gulf coasts. They normally arrive in Pennsylvania in April and May, and migrate south in August and September after nesting. Their nests are cup-shape, built of grasses and weeds on or near the ground. Clutch size ranges between 3 and 5, eggs are cream or pale green with brown speckling. Eggs hatch after 11 days of incubation, young first fly at about 10 days of age. Two broods may be produced during the nesting season. Henslow's sparrows are relatively unusual as sparrows go in that they are colonial nesters. They feed on crickets, beetles, caterpillars, ants and other insects, and weed and grass seeds.

PREFERRED HABITAT: Prairies, wet meadows and grassy fields, and pastures are the kinds of areas this species needs for nesting.

REASONS FOR BEING THREATENED: Henslow's sparrows are considered rare throughout their range. They are known to have nested across the state in suitable habitat, but they are known to nest now only in the western and northeastern parts of the state. The reasons for this decline are not known, but thought to be related to habitat loss. These birds apparently won't tolerate even slight habitat changes.

MANAGEMENT PROGRAMS: The status of the Henslow's sparrow in Pennsylvania will be more precisely determined following the field work portion of the state's Breeding Bird Atlas project. After it's learned where and how many nest in the state, research into their exact habitat needs may begin, followed by appropriate habitat development where feasible.



Small-footed Myotis

Myotis leibii

IDENTIFYING CHARACTERISTICS: The small-footed myotis may be distinguished from other small brown bats by its diminutive size (3½ inches, including a 1½-inch tail), black face, small feet (less than 0.3 inch), and short forearms (less than 1.5 inches). Its wing and tail membranes are blackish brown. This bat, however, is so similar in appearance to our most common bat, the little brown bat, and several other species that positive field identification is nearly impossible. Precise identification can be determined only by examining skull characteristics.

BIOLOGY-NATURAL HISTORY: The small-footed myotis is noted for hibernating closer to cave openings than other bats, and for hibernating alone, not clustered like other species of hibernating bats. Because this bat occurs in such small numbers, the likelihood of encountering any outside their hibernating areas is extremely remote. Therefore, little is known of this animal's habits when it's not in hibernation.

PREFERRED HABITAT: Small-footed bats apparently prefer caves and abandoned mine shafts located in the Allegheny mountains, with a possible preference for those located in hemlock-covered foothills.

REASONS FOR BEING THREATENED: The small-footed myotis has always been considered rare in Pennsylvania, but it is classified as threatened because of an apparent population decline between the 1930s and the late 1970s. Between 1930 and 1944 a mammalogist, Charles E. Mohr, made repeated surveys of hibernating bats in over 100 caves in Pennsylvania and West Virginia. He found only 363 small-footed myotis, all in only seven of the surveyed caves, and all of these are in central Pennsylvania. In 1978 and 1979 these seven caves were surveyed again, but no small-footed myotis were found. The only specimens found at all (10) were discovered in an abandoned mine tunnel.

MANAGEMENT PROGRAMS: The only known place where this species hibernates has been gated to eliminate human access, as disturbance during this period causes the animals to needlessly expend energy reserves needed to sustain them through the winter. Regular surveys are being conducted to monitor the status of the small-footed bat, and summertime mist-netting at likely caves and tunnels may be conducted to learn more about where this species goes at that time.



Marlin D. Tuttle, Bat Conservation International, Milwaukee Public Museum



THREATENED

Eastern Woodrat

Neotoma floridana



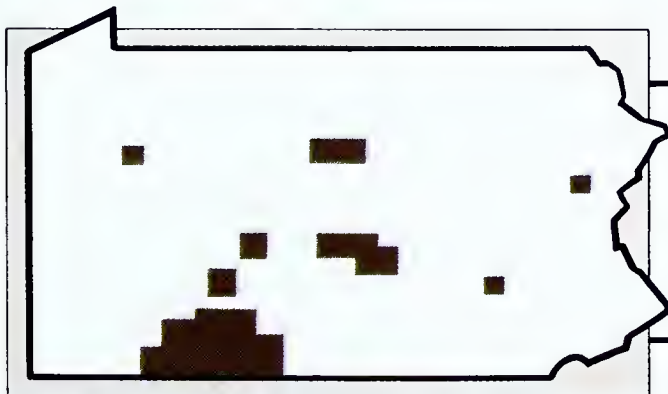
IDENTIFYING CHARACTERISTICS: The eastern woodrat is the eastern counterpart to the much better known packrat of the West. It is buffy gray above, with white underparts and paws. An adult averages just over a pound, and 17 inches in length, including an 8-inch tail. Its ears are large and may appear naked. The eastern woodrat is distinguished from the Norway rat —the only animal in Pennsylvania for which it may be confused — by its hairy bicolored tail. The Norway rat has a naked tail.

BIOLOGY/NATURAL HISTORY: This animal is found along the Appalachian mountains, from northern Alabama to western Connecticut. In Pennsylvania the eastern woodrat was historically found throughout the mountainous parts of the state, but recent surveys indicate its range here has diminished, with significant numbers found only in Fayette, Westmoreland and Indiana Counties. The presence of eastern woodrats is most often determined by their bulky nests made of twigs and bark, built on ledges or in caves. The breeding season runs from mid March until September, when up to three litters containing 2 or 3 young each may be produced.

PREFERRED HABITAT: The eastern woodrat does not thrive around civilization. It prefers rock ledges, caves, and rocky mountaintops, areas particularly inaccessible to people. This, and the fact woodrats are nocturnal, make this animal largely unknown among the general public.

REASONS FOR BEING THREATENED: The eastern woodrat has been classified as threatened because no woodrats were found during recent surveys where they were abundant in the 1940s, and even where they are known to exist, their numbers have decreased dramatically over the past 50 years.

MANAGEMENT PROGRAMS: Little is known about the woodrat's requirements. Before any management procedures can be developed, more detailed life history characteristics need to be learned, including more precise definitions of its habitat requirements, and the reasons for this apparent decline.



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Salamander	
Eastern Mud (<i>Pseudotriton m. montanus</i>)	20
Eastern Tiger (<i>Ambystoma tigrinum</i>)	19
Green (<i>Aneides aeneus</i>)	21
Sandpiper	
Upland (<i>Bartramia longicauda</i>)	25
Snake	
Massasauga (<i>Sistrurus catenatus</i>)	16
Sparrow	
Henslow's (<i>Ammodramus henslowii</i>)	29
Stickleback	
Threespine (<i>Gasterosteus aculeatus</i>)	13
Sturgeon	
Lake (<i>Acipenser fulvescens</i>)	14
Shortnose (<i>Acipenser brevirostris</i>)	15
Tern	
Black (<i>Chilodrias niger</i>)	26
Turtle	
Blanding's (<i>Emydoidea blandingii</i>)	10
Bog (<i>Clemmys Muhlen</i>)	11
Eastern Mud (<i>Kinosternon s. subrubrum</i>)	8
Midland Smooth Softshell (<i>Trionyx m. muticus</i>)	12
Red-Bellied (<i>Chrysemys rubriventris</i>)	9
Wren	
Bewick's (<i>Thryomanes bewickii</i>)	28
Sedge (<i>Cistothorus platensis</i>)	27



